

What Works Clearinghouse Improvement Index

In order to help readers judge the practical importance of an intervention’s effect, the WWC translates the effect size (see the [WWC Effect Size Technical Paper](#)) of the intervention’s effect into an “improvement index.” The improvement index represents the difference between the percentile rank corresponding to the intervention group mean and the percentile rank corresponding to the control group mean (i.e., 50th percentile) in the control group distribution. Alternatively, the improvement index can be interpreted as the expected change in percentile rank for an average control group student if the student had received the intervention.

As an example, if an intervention produced a positive impact on students’ reading achievement with an effect size of 0.25, the effect size could be translated to an improvement index of 10 percentile points. We could then conclude that the intervention would have led to a 10% increase in percentile rank for an average student in the control group, and that 60% ($10\% + 50\% = 60\%$) of the students in the intervention group scored above the control group mean.

Specifically, the improvement index is computed as follows:

1. Compute Cohen’s U3 index that corresponds to the effect size estimate.

The U3 index represents the percentile rank of a control group student who performed at the level of an average intervention group student. An effect size of 0.25, for example, would correspond to a U3 of 60%, which means that an average intervention group student would rank at the 60th percentile in the control group. Equivalently, an average intervention group student would rank 10 percentile points higher than an average control group student, who, by definition, ranks at the 50th percentile.

Mechanically, the conversion of an effect size to a U3 index entails looking up on a table that lists the proportion of area under the standard normal curve for different values of z-scores, which can be found in the appendices of most statistics textbooks. For a given effect size, U3 has a value equal to the proportion of area under the normal curve below the value of the effect size—under the assumptions that the outcome is normally distributed and that the variance of the outcome is similar for the intervention group and the control group.

2. Compute the improvement index as $(U3 - 50\%)$.

Given that U3 represents the percentile rank of an average intervention group student in the control group distribution, and that the percentile rank of an average control group student is 50%, the improvement index, defined as $(U3 - 50\%)$, would represent the difference in percentile rank of an average intervention group student and an average control group student in the control group distribution.